

REMARKS/ARGUMENT

Claims 7-14 have been added and are now presented for examination. Claims 1-6 have been cancelled without prejudice. With the exception of the requirement that the screw electrically connect a combined signal and power line on two of the circuit boards, the new claims are broader than the now cancelled claims. The specification has been amended as to a matter of form. Claims 7, 9, 11 and 13 are the only independent claims.

Claim 4 was objected to based on an informality. Cancellation of that claim renders the objection moot.

Claims 1, 3, 4 and 6 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,380,211 (Kawaguchi et al.). Claims 1, 2, 4 and 5 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 4,929,185 (Wong et al.). Claims 1, 2, 4 and 5 were rejected under 35 U.S.C. § 103 as obvious from U.S. Patent 5,130,894 (Miller) in view of Kawaguchi et al. Cancellation of claims 1-6 renders their various rejections moot. Applicant submits that new independent claims 7, 9, 11 and 13 are patentable over the cited references for at least the following reasons.

Independent Claim 7 is directed to a method for electrically and mechanically connecting at least two circuit boards. Each of the at least two circuit boards has one or more wiring patterns thereon, each wiring pattern including a plurality of wiring portions, at least one wiring portion on each circuit board being a combined signal line and power line. The method comprises mechanically and electrically connecting the at least two circuit boards together such that: a connector couples a plurality of the wiring portions of one of the at least two circuit boards to respective wiring portions of another of the at least two circuit boards, and a screw couples the at least two circuit boards together and electrically connects a combined signal line and power line on one of the at least two circuit boards to a combined signal line and power line on another of the at least two circuit boards.

By virtue of the recited method, by establishing electrical interconnection of wirings on plural circuit boards by a screw that also functions to secure and space apart the circuit boards, the number of pins on connectors used for interconnection of the wirings can be reduced, decreasing the mounting space required for such connectors on the surface of the circuit board.

Kawaguchi et al., as understood, shows the use of a bolt 6 or electrically conductive screw into a bolt receiving hole 8 in a circuit board 2 at the center of a coaxial connector. The bolt provides electrical connection between signal conductors 16 and 17 on the outer surfaces of circuit boards 2 and 4 while acting as the center conductor of the coaxial connector. See Fig. 1; col. 2, lines 25-50. As the center conductor of a coaxial connector, the bolt carries signal information.

Wong et al., as understood, shows is Fig. 3 a device 30a, including a screw 28a and a spacer 24, for joining and separating circuit boards. According to Wong et al., the device provides a ground between the joined circuit boards if the screw 28a and spacer 24 are electrically conductive. See col. 3, lines 12-25.

Miller, according to Applicant's understanding, shows a three-dimensional circuit structure purportedly useful in semiconductor memories. As is discussed at col. 3, lines 59-63, bolts 51, in addition to holding a stack of circuit boards together, may serve also to feed power from the motherboard to constituent modules of the stack.

However, Applicant has found no teaching or suggestion in any of the cited references of the feature of new independent claim 7 by which a wiring portion on each circuit board is a combined signal line and power line, a screw couples the circuit boards together, and an electrical connection is effected by the screw between a combined signal line and power line on one of the circuit boards and a combined signal line and power line on another of the circuit boards. Accordingly, claim 7 is believed patentable over the cited references.

Independent claim 9 is an apparatus claim substantially corresponding to independent method claim 7. Claim 9 is believed to be patentable for substantially the same reasons discussed above in connection with new independent claim 7.

Claim 11 is directed to a method for electrically and mechanically connecting at least two circuit boards, each of the at least two circuit boards having one or more wiring patterns thereon. Each wiring pattern includes a plurality of wiring portions, at least one wiring portion on each circuit board being a signal line and at least one wiring portion on each circuit board being a power line. The method comprises mechanically and electrically connecting the pair of circuit boards together such that: a connector couples a plurality of the wiring portions of one of the at least two circuit boards to respective wiring portions of another of the at least two circuit boards, and a plurality of screws couple the at least two circuit boards together and electrically connects at least one signal line and one power line on one of the at least two circuit boards to a respective signal line and power line on another of the at least two circuit boards.

As a result of the features recited in claim 11, power lines and signal lines may be connected between circuit boards by plural screws that also function to couple the boards together. Applicant has found no teaching or suggestion in any of the cited references, discussed above, of the feature by which electrical connection is effected between at least one signal line and one power line on one of the at least two circuit boards and a respective signal line and power line on another of the at least two circuit boards, as recited in claim 11. Accordingly, claim 11 is believed clearly patentable over the cited references.

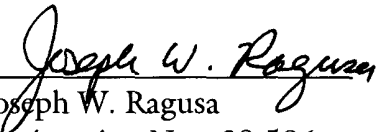
Independent claim 13 is an apparatus claim substantially corresponding to independent method claim 11. Claim 13 is believed to be patentable for substantially the same reasons discussed above in connection with new independent claim 11.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

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Respectfully submitted,

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